<u>IN THE CLAIMS</u>

Please cancel claims 8, 21 and 34, amend claims 1, 6, 9, 10, 11, 14, 19, 22, 23, 24, 27, 32, 35 and 36, and add new claims 40-45 as follows:

1. (CURRENTLY AMENDED) A method for sculpting ~~solids~~ <u>a part body</u> with sheet bodies in a computer-implemented solid modeling system, comprising:

(a) performing a selective Boolean operation on a part body and one or more sheet bodies, wherein faces of the sheet bodies separate the part body into regions of space such that the regions are separated from each other by the faces of the sheet bodies<u>, wherein the performing step (a) comprises performing a pre-processing phase to create a cellular topology graph of tool and blank bodies created from the part body and the sheet bodies, performing an analysis phase to categorize and convert cells in the cellular topology graph; and performing a post-processing phase to integrate results from the analysis phase to create an output part body.</u>

2. (ORIGINAL) The method of claim 1, wherein the step of performing is invoked by a join option.

3. (ORIGINAL) The method of claim 2, wherein the join specifies that material will be added to the part body.

4. (ORIGINAL) The method of claim 1, wherein the step of performing is invoked by a cut option.

5. (ORIGINAL) The method of claim 4, wherein the cut specifies material will be taken away from the part body.

6. (CURRENTLY AMENDED) The method of claim 1, wherein the sheet body has a face side label that indicates which [[side]] <u>face</u> of the sheet should be used <u>in the selective Boolean operation.</u>

7. (ORIGINAL) The method of claim 6, wherein the face side label is selected from a group comprising normal, anti-normal or both.

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8. (CANCELED)

9. (CURRENTLY AMENDED) The method of claim 1, wherein the performing step (a) further comprises:

(1) labeling faces in the part body and sheet bodies;

(2) creating a blank body from the part body and the sheet bodies;

(3) creating a tool body large enough to contain the blank body in its entirety;

(4) applying a selective Boolean operation to the tool body and blank body to generate a collection of solid cells;

(5) generating a cellular topology graph that contains a vertex for each cell in the collection of solid cells, and graph edges between pairs of vertices whenever their associated cells in the collection of solid cells are adjacent;

(6) creating a meta-graph from the cellular topology graph and the part body;

(7) categorizing the meta-graph's cells as either interior cells or exterior cells;

(8) selectively converting the categorized cells from interior to exterior or exterior to interior; and

(9) combining the meta-graph's cells marked as interior to create an output part body.

10. (CURRENTLY AMENDED) The method of claim 9, wherein the labeling step (1) comprises marking all faces in the part body with an attribute that identifies them as being part of the part body and marking all faces on the ~~limiting~~ sheet <u>bodies</u> with an attribute that identifies them as being part of the sheet bodies.

11. (CURRENTLY AMENDED) The method of claim 9, wherein the creating step (2) comprises:

turning the part body into a hollowed-out part body in order to form a sheet body; and creating the blank body by uniting all the ~~limiting~~ sheet <u>bodies</u> together with the hollowed-out part body to create a non-manifold sheet body.

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12. (ORIGINAL) The method of claim 9, wherein the selectively converting step (8) comprises:

converting all critical exterior cells to interior cells, if a join is performed.

13. (ORIGINAL) The method of claim 9, wherein the selectively converting step (8) comprises:

converting all critical interior cells to exterior cells, if a cut is performed.

14. (CURRENTLY AMENDED) An apparatus for sculpting ~~solids~~ a part body with sheet bodies, comprising:

a computer; and

a solid modeling system, executed by the computer, having logic for:

(a) performing a selective Boolean operation on a part body and a sheet body, wherein faces of the sheet body separate the part body into regions of space such that the regions are separated from each other by the faces from the sheet body, wherein the logic for performing (a) comprises logic for performing a pre-processing phase to create a cellular topology graph of tool and blank bodies created from the part body and the sheet bodies, performing an analysis phase to categorize and convert cells in the cellular topology graph, and performing a post-processing phase to integrate results from the analysis phase to create an output part body.

15. (ORIGINAL) The apparatus of claim 14, wherein the logic for performing (a) is invoked by a join option.

16. (ORIGINAL) The apparatus of claim 15, wherein the join specifies that material will be added to the part body.

17. (ORIGINAL) The apparatus of claim 14, wherein the logic for performing (a) is invoked by a cut option.

18. (ORIGINAL) The apparatus of claim 17, wherein the cut specifies material will be taken away from the part body.

19. (CURRENTLY AMENDED) The apparatus of claim 14, wherein the sheet body has a face side label that indicates which [[side]] face of the sheet should be used in the selective Boolean operation.

20. (ORIGINAL) The apparatus of claim 19, wherein the face side label is selected from a group comprising normal, anti-normal or both.

21. (CANCELED)

22. (CURRENTLY AMENDED) The apparatus of claim 14, wherein the logic for performing (a) further comprises logic for:
    (1) labeling faces in the part body and sheet bodies;
    (2) creating a blank body from the part body and the sheet bodies;
    (3) creating a tool body large enough to contain the blank body in its entirety;
    (4) applying a selective Boolean operation to the tool body and blank body to generate a collection of solid cells;
    (5) generating a cellular topology graph that contains a vertex for each cell in the collection of solid cells, and graph edges between pairs of vertices whenever their associated cells in the collection of solid cells are adjacent;
    (6) creating a meta-graph from the cellular topology graph and the part body;
    (7) categorizing the meta-graph's cells as either interior cells or exterior cells;
    (8) selectively converting the categorized cells from interior to exterior or exterior to interior; and
    (9) combining the meta-graph's cells marked as interior to create an output part body.

23. (CURRENTLY AMENDED) The apparatus of claim 22, wherein the logic for labeling (1) comprises logic for marking all faces in the part body with an attribute that identifies them as being part of the part body and marking all faces on the ~~limiting~~ sheet <u>bodies</u> with an attribute that identifies them as being part of the sheet bodies.

24. (CURRENTLY AMENDED) The apparatus of claim 22, wherein the logic for creating (2) comprises logic for:
turning the part body into a hollowed-out part body in order to form a sheet body; and creating the blank body by uniting all the ~~limiting~~ sheet <u>bodies</u> together with the hollowed-out part body to create a non-manifold sheet body.

25. (ORIGINAL) The apparatus of claim 22, wherein the logic for selectively converting (8) comprises logic for:
converting all critical exterior cells to interior cells, if a join is performed.

26. (ORIGINAL) The apparatus of claim 22, wherein the logic for selectively converting (8) comprises logic for:
converting all critical interior cells to exterior cells, if a cut is performed.

27. (CURRENTLY AMENDED) An article of manufacture embodying logic for sculpting ~~solids~~ <u>a part body</u> with sheet bodies in a computer-implemented solid modeling system, the logic comprising:
(a) performing a selective Boolean operation on a part body and a sheet body, wherein faces of the sheet body separate the part body into regions of space such that the regions are separated from each other by the faces from the sheet body<u>, wherein the performing step (a) comprises performing a pre-processing phase to create a cellular topology graph of tool and blank bodies created from the part body and the sheet bodies, performing an analysis phase to categorize and convert cells in the cellular topology graph, and performing a post-processing phase to integrate results from the analysis phase to create an output part body</u>.

28. (ORIGINAL) The article of claim 27, wherein the step of performing is invoked by a join option.

29. (ORIGINAL) The article of claim 28, wherein the join specifies that material will be added to the part body.

30. (ORIGINAL) The article of claim 27, wherein the step of performing is invoked by a cut option.

31. (ORIGINAL) The article of claim 30, wherein the cut specifies material will be taken away from the part body.

32. (CURRENTLY AMENDED) The article of claim 27, wherein the sheet body has a face side label that indicates which [[side]] face of the sheet should be used in the selective Boolean operation.

33. (ORIGINAL) The article of claim 32, wherein the face side label is selected from a group comprising normal, anti-normal or both.

34. (CANCELED)

35. (CURRENTLY AMENDED) The article of claim 27, wherein the performing step (a) further comprises:

    (1) labeling faces in the part body and sheet bodies;

    (2) creating a blank body from the part body and the sheet bodies;

    (3) creating a tool body large enough to contain the blank body in its entirety;

    (4) applying a selective Boolean operation to the tool body and blank body to generate a collection of solid cells;

    (5) generating a cellular topology graph that contains a vertex for each cell in the collection of solid cells, and graph edges between pairs of vertices whenever their associated cells in the collection of solid cells are adjacent;

(6) creating a meta-graph from the cellular topology graph and the part body;

(7) categorizing the meta-graph's cells as either interior cells or exterior cells;

(8) selectively converting the categorized cells from interior to exterior or exterior to interior;
and

(9) combining the meta-graph's cells marked as interior to create an output part body.

36. (CURRENTLY AMENDED) The article of claim 35, wherein the labeling step (1) comprises marking all faces in the part body with an attribute that identifies them as being part of the part body and marking all faces on the ~~limiting~~ sheet bodies with an attribute that identifies them as being part of the sheet bodies.

37. (CURRENTLY AMENDED) The article of claim 35, wherein the creating step (2) comprises:

turning the part body into a hollowed-out part body in order to form a sheet body; and creating the blank body by uniting all the ~~limiting~~ sheet bodies together with the hollowed-out part body to create a non-manifold sheet body.

38. (ORIGINAL) The article of claim 35, wherein the selectively converting step (8) comprises:

converting all critical exterior cells to interior cells, if a join is performed.

39. (ORIGINAL) The article of claim 35, wherein the selectively converting step (8) comprises:

converting all critical interior cells to exterior cells, if a cut is performed.

40. (NEW) The method of claim 1, wherein an output of the Boolean operation adds any regions of space that are bound by the part body and the sheet bodies, and that satisfies some selection criteria.

41. (NEW) The method of claim 1, wherein an output of the Boolean operation removes any regions of the part body that are bound by the faces of the part body and the sheet bodies, and that satisfies some selection criteria.

42. (NEW) The apparatus of claim 14, wherein an output of the Boolean operation adds any regions of space that are bound by the part body and the sheet bodies, and that satisfies some selection criteria.

43. (NEW) The apparatus of claim 14, wherein an output of the Boolean operation removes any regions of the part body that are bound by the faces of the part body and the sheet bodies, and that satisfies some selection criteria.

44. (NEW) The article of claim 27, wherein an output of the Boolean operation adds any regions of space that are bound by the part body and the sheet bodies, and that satisfies some selection criteria.

45. (NEW) The article of claim 27, wherein an output of the Boolean operation removes any regions of the part body that are bound by the faces of the part body and the sheet bodies, and that satisfies some selection criteria.